5. (Once Amended) A system of racing control in system management by a Common Management Information Protocol (CMIP) operations defined by the Open System Interconnection (OSI) model for switching systems and operations inherent to the system, provided with:

an operation registration table for registering operations now being executed;

a common racing control table for establishing correspondence between classifications of operations of CMIP and classifications of control of operations inherent to the system and storing information on whether or not newly requested operations may be executed; and

a racing control unit including a first means for extracting operations now being executed form the operation registration table upon newly requested operations, a second means for determining whether or not the external expression corresponding to the managed object instance of the operations now being extracted by this first means and the external expression of the newly requested operations are the same, and a third means for, when it is determined that they are the same by this second means, determining whether the newly requested operations may be executed by referring to the common racing control table.

## REMARKS

With regard to the rejection to Figs. 4A, 4B, 5A, 5B, 6A and 6B, attached hereto are proposed amendments to those drawings for the approval of the Examiner.

With regard to the objection to Figs. 1A, 1B, 7A, 7B, 8A, 8B, 9A and 9B, Applicant respectfully disagrees that these drawings fail to show a continuation of the drawings from one

figure to another. Specifically, Figs. 1A and 1B show the symbol "*1" as indicating such a continuation. Likewise, the symbols "*1" "*2" and "*3", show a continuation of Figs. 7A and 7B, Figs. 8A and 8B, and Figs. 9A and 9B. The specification has been amended to overcome the objection to the disclosure.

Claims 1-5 were rejected under 35 U.S.C. §112, second paragraph. Claim 5 has been amended to overcome ground for this rejection based upon the feature of "fourth, fifth, and sixth means".

With regard to the Examiner's allegation that claims 1-5 disclose "an/the Open Systems Interconnection (OSI) model" without limitation, it is respectfully submitted that Open System Interconnection (OSI) is a common term, well established throughout the world. For example, the term "OSI" is used in the ITU-T Recommendation at X.721, a copy of which is enclosed.

Claim 4 was rejected under 35 U.S.C. §102(a) as being anticipated by Hisayoshi, U.S. Patent No. JPO 6-303288. Claims 1 and 8 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hisayoshi and Moeller, U.S. Patent No. 5,519,867. Claims 2-3 and 5-7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hisayoshi and Moeller in view of what was allegedly well known in the art.

In Hisayoshi, however, a certain problem exists. In racing control of the CMIP operation, CMIP operations are translated into internal commands including command identification information and racing control is performed between commands groups to which the internal commands belong. Accordingly, processing is increased for translating operations into internal commands and racing decisions cannot be carried out in units of object instance. Thus, there is a problem in that racing cannot be sufficiently controlled.

In order to solve the above problem, an object of the present invention is to perform fine racing control between CMIP operations and operations inherent to a system in units of the smallest instance.

The problem in Hisayoshi and the object of this invention are explained in the specification, (see from page 3, line 34 to page 4, line 21).

Hisayoshi neither discloses nor suggests that the racing control is performed between CMIP operations in units of instance, by the configurations disclosed in claims 1 to 5 of the present invention.

Regarding Moeller, in paragraph 1 of item 5 of the Office Action, the Examiner insists that Moeller defines an object as an instance of some class.

However, in the portions of Moeller cited by the Examiner, i.e. column 2, lines 30 to 33, column 3, lines 59 to 67, and column 4, lines 1 to 22, there is no description relating to such an instance.

Further, Moeller relates to very general object-oriented multitasking systems. However, in the present invention, it is to be applied particularly to a switching system among such object-oriented multitasking systems (see, e.g. on page 1, lines 10 and 11).

Thus, Moeller is not directly related to the switching system, as described by the present invention.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached pages are captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE.**"

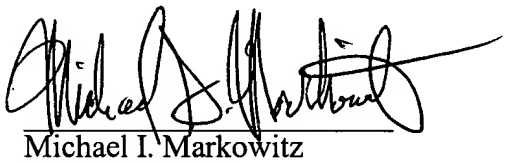
## CLOSING

An earnest effort has been made to be fully responsive to the Examiner's objections. In view of the above amendments and remarks, it is believed that independent claims 1-5 are in condition for allowance, as well as those claims dependent therefrom. Passage of this case to allowance is earnestly solicited.

However, if for any reason the Examiner should consider this application not to be in condition for allowance, he is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper, not fully covered by an enclosed check, may be charged on Deposit Account 50-1290.

Respectfully submitted,



Michael I. Markowitz
Reg. No. 30,659

Enclosure: Version With Markings to Show Changes Made
Amended Figs. 4A, 4B, 5A, 5B, 6A, 6B
Copy of ITU-T Recommendation X.721

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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

### IN THE SPECIFICATION

The paragraph on page 17, lines 11-19, has been rewritten as follows:

For example, when the command (verb) now being executed and a newly requested command (verb) are the same ENT (corresponding to [M-GET] M-CREATE of CMIP operation) and DLT (corresponding to M-DELETE of the CMIP operation), the HOST racing control unit 13 refers to the common racing control table 16 and sends the message of processing failure "PROCESSING FAILURE". Similarly, in the case of EDT, RST, and RMV (corresponding to M-SET of CMIP operation), it sends the message of processing failure "PROCESSING FAILURE". Namely, it refuses execution of the newly requested operation.

### IN THE CLAIMS

Claims 1-5 have been rewritten as follows:

1. (Once Amended) A method of racing control in system management including the steps of determining, regarding newly requested operations under the Common Management Information Protocol (CMIP) defined by an Open System Interconnection (OSI) [model,] model for switching systems, whether or not a managed object instance of operations now being executed and a managed object instance specified by the newly requested operations are the same and, when the instances are different, allowing execution of the newly requested operations, while when the instances are the same, referring to a racing control table formed based on a combination of operation classifications to determine whether it is possible to execute the newly requested operations.

2. (Once Amended) A method of racing control in system management including the steps of determining, regarding either one of the newly requested operations of operations under the Common Management Information Protocol (CMIP) defined by the Open System Interconnection (OSI) model for switching systems and operations inherent to the system, whether or not an external expression establishing correspondence between managed object instances of CMIP operations and resources to be controlled of operations inherent to the system is the same as the external expression of the operations now being executed, when they are different, allowing the execution of the newly requested operations, while when they are the same, establishing correspondence of the classification of CMIP operations with a classification of control of operations inherent to the system and referring to a common racing control table formed based on combinations of the latter classifications of control to determine whether it is possible to execute the newly requested operations.

3. (Once Amended) A method of racing control in system management including the steps of determining, regarding either one of the newly requested operations of operations under the Common Management Information Protocol (CMIP) defined by the Open System Interconnection (OSI) model for switching systems and operations inherent to the system, whether or not an external expression establishing correspondence between managed object instances of CMIP operations and resources to be controlled of operations inherent to the system is the same as the external expression of the operations now being executed, when they are different, allowing the execution of the newly requested operations, while when they are the same, establishing correspondence of the classification of CMIP operations with the classification of control of operations inherent to the system and referring to a common racing

control table formed based on combinations of the former classifications of operations to determine whether it is possible to execute the newly requested operations.

4. (Once Amended) A system of racing control in system management by a Common Management Information Protocol (CMIP) operations defined by the Open System Interconnection (OSI) [model,] model for switching systems, provided with:

an operation registration table for registering operations now being executed;

a racing control table for storing information of whether or not newly requested operations may be executed in the form (matrix) of combinations of classifications of newly requested and now being executed CMIP operations; and

a racing control unit including a first means for extracting operations now being executed from the operation registration table upon newly requested operations, a second means for determining whether or not the managed object instance of the operations now being executed extracted by this first means and the managed object instance of the newly requested operations are the same, and a third means for, when it is determined by this second means that they are the same, determining whether or not newly requested operations can be executed by referring to the racing control table.

5. (Once Amended) A system of racing control in system management by a Common Management Information Protocol (CMIP) operations defined by the Open System

Interconnection (OSI) model for switching systems and operations inherent to the system, provided with:

an operation registration table for registering operations now being executed;

a common racing control table for establishing correspondence between classifications of operations of CMIP and classifications of control of operations inherent to the system and storing information on whether or not newly requested operations may be executed; and

a racing control unit including a [fourth] first means for extracting operations now being executed form the operation registration table upon newly requested operations, a [fifth] second means for determining whether or not the external expression corresponding to the managed object instance of the operations now being [executed] extracted by this [fourth] first means and the external expression of the newly requested operations are the same, and a [sixth] third means for, when it is determined that they are the same by this [fifth] second means, determining whether the newly requested operations may be executed by referring to the common racing control table.

# Fig.4A

| OPERATION BEING EXECUTED / NEWLY REQUESTED OPERATION | M-CREATE | M-DELETE | M-SET | M-GET | M-ACTION |
|---|---|---|---|---|---|
| M-CREATE | (RACING CONTROL) PROCESSING FAILURE | OSI TOOL CORE ERROR: ALREADY CREATED | OSI TOOL CORE ERROR: ALREADY CREATED | OSI TOOL CORE ERROR: ALREADY CREATED | OSI TOOL CORE ERROR: ALREADY CREATED |
| M-DELETE | OSI TOOL CORE ERROR: NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE |

CONTINUED ON FIG.4B

Fig.4B

| OPERATION BEING EXECUTED / NEWLY REQUESTED OPERATION | M-CREATE | M-DELETE | M-SET | M-GET | M-ACTION |
|---|---|---|---|---|---|
| M-SET | OSI TOOL CORE ERROR:NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES |
| M-GET | OSI TOOL CORE ERROR:NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES |
| M-ACTION | OSI TOOL CORE ERROR:NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES |

Fig. 5A

| VERB BEING EXECUTED / NEWLY REQUESTED VERB | ENT | DLT | EDT, RST, RMV | RTRV | TEST |
|---|---|---|---|---|---|
| ENT | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) ERROR: ALREADY CREATED | (RACING CONTROL) ERROR: ALREADY CREATED | (RACING CONTROL) ERROR: ALREADY CREATED | (RACING CONTROL) ERROR: ALREADY CREATED |
| DLT | (RACING CONTROL) ERROR: NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE |

CONTINUED ON FIG. 5B

Fig.5B


| VERB BEING EXECUTED / NEWLY REQUESTED VERB | ENT | DLT | EDT,RST, RMV | RTRV | TEST |
|---|---|---|---|---|---|
| EDT,RST, RMV | (RACING CONTROL) ERROR:NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES |
| RTRV | (RACING CONTROL) ERROR:NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES |
| TEST | (RACING CONTROL) ERROR:NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES |

Fig.6A

| VERB BEING EXECUTED / NEWLY REQUESTED VERB | M-CREATE | M-DELETE | M-SET | M-GET | M-ACTION |
|---|---|---|---|---|---|
| M-CREATE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) ERROR: ALREADY CREATED | (RACING CONTROL) ERROR: ALREADY CREATED | (RACING CONTROL) ERROR: ALREADY CREATED | (RACING CONTROL) ERROR: ALREADY CREATED |
| M-DELETE | (RACING CONTROL) ERROR: NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE |

CONTINUED ON FIG. 6B

# Fig.6B


| VERB BEING EXECUTED / NEWLY REQUESTED VERB | M-CREATE | M-DELETE | M-SET | M-GET | M-ACTION |
|---|---|---|---|---|---|
| M-SET | (RACING CONTROL) ERROR:NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES |
| M-GET | (RACING CONTROL) ERROR:NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES |
| M-ACTION | (RACING CONTROL) ERROR:NO SUCH INSTANCE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) PROCESSING FAILURE | (RACING CONTROL) NORMAL OPERATION CONTINUES | (RACING CONTROL) NORMAL OPERATION CONTINUES |

INTERNATIONAL TELECOMMUNICATION UNION

# CCITT

# X.721

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

## DATA COMMUNICATION NETWORKS

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# INFORMATION TECHNOLOGY - OPEN SYSTEMS INTERCONNECTION - STRUCTURE OF MANAGEMENT INFORMATION: DEFINITION OF MANAGEMENT INFORMATION

## Recommendation X.721

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Geneva, 1992

TCP/IP ネットワークのサービスやプロトコルについては，既に世界中で多くの良書が出版されている。本書では少しでも多くのページをネットワーク管理の解説に費やすことを目的にしているので，これ以上の細かな説明はしない。しかし，SNMP のプロトコルを理解するための基礎知識として，次の点を思い出していただきたい。

① ネットワーク層に相当する IP (Internet Protocol)は，IP データグラム(パケット)のルーティングなどエンド・トゥ・エンドの通信を行うコネクションレス型のプロトコルである。

② TCP (Transmission Control Protocol)と UDP (User Datagram Protocol)はともにトランスポート層のプロトコルであるが，TCP はコネクション型，UDP はコネクションレス型である。

③ アプリケーション(TELNET，FTP など)の下位層としては，上記のネットワーク/トランスポートの 2 層の組み合わせにより，TCP/IP と UDP/IP の 2 通りのプロトコル・スタックが考えられる。当然ながら TCP/IP はコネクション型，UDP/IP はコネクションレス型である。

④ コネクション型プロトコルでは，送信側が送信した順序でデータが相手に届くことが保証され，また受信データに誤りがあった場合などに再送を行うメカニズムも定められている。これに対してコネクションレス型プロトコルでは，データ送信の前にコネクションを設定することがないので，送信されたデータが相手に必ず届くという保証がなく，エラーや再送の制御などはそのプロトコルを利用する上位のサービスに委ねられる。

⑤ TCP，UDP ともに上位サービスとの間のインタフェースはポートと呼ばれ，上位サービスごとに，あるいは起動プロセスごとに異なったポート番号が与えられる。FTP，TELNET，SNMP など一連の規格に対しては既に well-known ポートと呼ばれるポート番号が割り当てられている。TCP や UDP にアクセスして TCP/IP ネットワーク上の別ノード内のアプリケーションと通信する場合には，このポート上に作成されたソケットに対する





read ()や write ()システム・コールを用いることになる。本書では必ずしもソケット・プログラミングの知識は必要ではないが，SNMP のプロトコルの説明ではこのポートについて少々触れることになる。



### 1.1.3 OSI ネットワーク

1978年に異機種間の相互通信のために ISO (国際標準化機構： International Organization for Standardization)が標準化作業に着手して既に十数年になる。ゆっくりではあるが着実にネットワーク・アーキテクチャの標準化が進み，通信の中心となる部分のプロトコルやサービスの定義は終了し，OSI 管理に関する標準化もいくつかのドラフトを除いて標準化が終了しつつある。

この標準化されたネットワーク・アーキテクチャは OSI (Open Systems Interconnection ：開放型システム間相互接続)と呼ばれており，図1.6に示す OSI 参照モデル(OSI Reference Model)の 7 層の階層モデルはあまりに有名である。

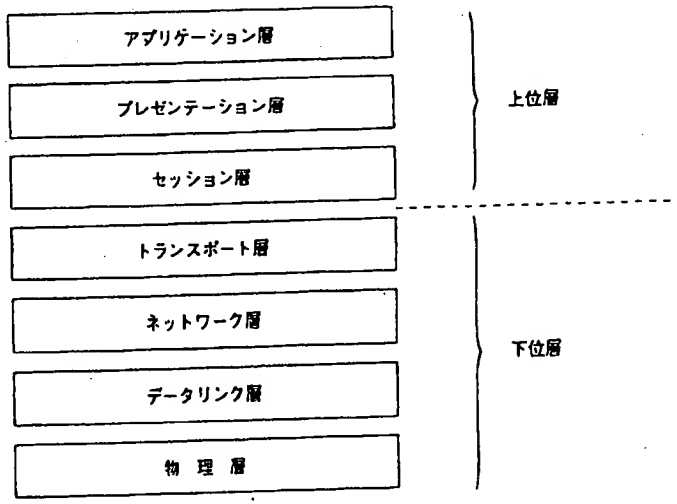


図1.6 OSI 参照モデルの 7 階層